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ABSTRACT

The degree of consciousness of one's own familiar surroundings by high and low achieving students of a technical gymnasium in Malmo (Sweden) was studied through essays written about Sweden as a place to live. Focus was on testing the proposition that an individual's ability to express cognitive integration of experience in covariation with personal knowledge is reflected through natural language, based on the assumption that selective attention and schematic processing are directly built into the process of perception. Essays of 4 students were chosen from 85 submitted. Using these four subjects as coordinate systems and bio-psycho-physical frames of reference, it was demonstrated that the order of performance can be upheld over levels of analysis. The way in which transformations of aggregates of joint textual element complexes become fashioned into single functional unities was also shown. On the basis of these unities, absolute termini (limits) are established and named. These termini provide for the structural connections that specify the informational invariants of one's own referential reality. These invariants also serve as keys to consciousness in the Kantian sense (intuition), and thus give a precise phenomenological description of reality through systemic deduction. (SLD)

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Abstract

The focus is on the degree of consciousness of one's own familiar surroundings by high and low achieving students of a technical Gymnasium in the City of Malmö, southern Sweden. Consciousness and its scientific foundation has been in the centre of interest in a series of experiments on the perspectivation of model-typic and proto-typic environments. The present experiment has been designed for continuation of this line. Its purpose is to give an account of the individual's consciousness of his referential society. On the basis of four experimental subjects as co-ordinate systems and bio-psycho-physical frames of reference, it is demonstrated that the order of performance can be upheld over levels of analysis. Moreover, it is shown in what way the transformations of aggregates of joint textual element complexes become fashioned into single functional unities. On the basis of these unities absolute termini (limits) are established and named. These provide for the structural connections that specify the informational invariants of one's own referential reality. Likewise, these invariants serve as keys to consciousness in the Kantian sense, i.e. intuition, and thus give a precise phenomenological description of reality through systemic deduction.

The present study is part of a research program oriented toward the methodology of studying the individual's way of becoming conscious of himself and his surrounding world, i.e. "knowability" (Bierschenk, 1984). The major assumption made is that the co-operation of a knower with a knowable environment can give a clear cut understanding of the "mental invariants" as well as the "contextual constraints" that are assumed to enclose behaviour. This approach toward knowing makes fully use of Kant's (1787-1790; 1975) definition and, therefore, is based on the following axiomatic descriptions of concepts representing the environment as well as the obtained behavioural responses:

(1) *A priori-analytic*: Predefined concepts.
(2) *A posteriori-analytic*: Prototypical concepts defining the states of the system under investigation.
(3) *A priori- synthetic*: Axioms such as the axiom of number and the AaO axiom.
(4) *A posteriori-synthetic*: Discovery of experience exhibiting the topologically derived formal concepts, i. e. the terms of a system.

In recognising the complexity of dependency relations between persons, objects, and events, it was necessary to determine the units of action, their levels and hierarchies by modelling the environment on the basis of the following three scientific concepts:

(1) Behaviour modification, whose central theme is that civilisation emerges from different contingencies of variation and selection. Individual members survive with the educational practices within their cultures.

(2) Evolution, whose central theme is that civilisation emerges from taking on responsibility for one's own life and the physical and cultural development of the world one lives in.

(3) Cybernetics, whose central theme is that civilisation emerges from certain interconnected physical and social systems that affect the development of the physical and social world.

From a Kantian point of view, these concepts are "concrete", because they are fully synthetic and thus, complete and particular. As such they yield no occasion for discursive speculation about the state of the world. Once these concepts have been made the foundation for constructing a narrative, knowing can be approached in the "Kantian sense par excellence". According to (Brodsky, 1987 p. 10) this approach excludes the occurrence of anything that is unknown, i.e. ambiguous, unrepresented, unnamed and consequently formless.

The individual observer's attention may be attracted by the way in which population grows, agricultural production is carried out, natural resources are used, and industrial production and pollution has influenced our lives. Because these aspects are pertinent of development of modern Western societies, they have been the basic theme in the construction of a "world model" by Meadows, Meadows, Randers & Behrens (1972). These authors simulate five major trends that are believed to be of global concern, namely (1) accelerated industrialisation, (2) rapid population growth, (3) widespread malnutrition, (4) depletion of nonrenewal resources, and (5) deterioration of environment. In this simulation the individual observer's assignment of attention ratings constitutes his orientation toward the probability of catastrophic events. Consequently, attention has been scaled according to the following colours: Blue for high satisfaction, Green for satisfaction, Yellow for slight satisfaction, Orange for moderate urgency, and Red for

highest urgency. The Biological Science Curriculum Study and Crystal Productions (1976) has incorporated this colour scale into a series of slides that could be used for a visualisation of an experimental context necessary for an investigation into current knowledge of civilised societies. On the basis of the given scientific concepts, a pictured layout of scenarios on possible trends was produced with the intention to account for certain fundamental properties of civilisation.

Model-typic Environments Used in Experimental Set-up

The Blue-Green Scenario. It portrays a farming community that builds on sound ecological principles. The pursuit of knowledge is valued, and technology is used with constraining ecological conditions in mind. Success in management of natural resources and appropriate life-styles is demonstrated as simple yet comfortable living. The interrelationships of man and nature is made obvious and shown to govern human behaviour. Goal criteria are explored through a character that is faced with the requirement of making up his mind with respect to problems intimately connected with the interrelatedness of living systems. Responsible acting and personal engagement are the cornerstones of successful corporations between individual and environment. Mental processing in co-operation with a significant other person is used to demonstrate one's own possibility of becoming, and to promise personal progression.

The Yellow Scenario. It displays mechanisms of social conformity and justification that operate within security and public health environments. The main theme underlying the course of events concerns the effectiveness of implementation of behavioural controls, i.e. operant conditioning, into the social context. Operant conditioning is seen as a fact of human behaviour (Skinner, 1960). Intimately connected to it is the question of bonding as effective means in the fostering of a feeling for right and wrong. A time schedule is employed with the intention to control the adherence to a rule system and its obligatory content. Discriminative rule perception and role expectation are governed through predefined professional advancement and occasional reward. Successful behavioural discrimination of presented stimuli is judged with reference to equality of opportunity. In the behavioural response, correctness has importance for its predictability, and thus the social survival of the individual.

The Orange-Red Scenario. It shows an urban high-technology community whose subsystems comprise the interconnected parts. Exchange of matter, energy and information is determined by the implicit limits of the interacting systems. Its control mechanisms define their return to certain limits to equilibrium with the rest of the components. The focus is on limits of control and available means to adapt to the physical and social environment as well as the finite character of resources . A single chain of catastrophic events is used to demonstrate the finiteness and implications of continued growth as well as the restrictions due to rational decision making.

From the methodological point of view, these forms of representational environments concern the affordances of the realised civilisations. Moreover, the pictured layout of these scenarios is aimed at mediating a topological correspondence between particular courses of events and the affordances they carry. The measurement of depicted behaviour is based on the premise that the information in the medium is sufficient to account for preciseness in direct perception of environmental textures. To ensure the formal or representational function of measurement, it has been directed toward the following affordances:

(1) There are limits to our resources, to our food-production potential and nutrition, to our technological abilities, to the capacity of our natural environment, to dispose of

technology, to supply dwelling and clothing, to guarantee price stability, full employment and energy supply.

(2) Scientific knowledge alone is not enough to solve the problems of limitation that are identified. Systems theoretic points of view are significant, and the ecological tenet is valid. Moreover, time and space are organiser of our a priori structure to which experience must conform. Thinking in consequences is stressed as well as one's capacity of utilising information on social issues. Circumstances that threatens survival are focused upon such as physical health, psychic health and prosperity.

(3) Morality and ethical concerns imply that there are cautions and recommended courses of action which are largely ignored, because of their social, economic and political implications. To guarantee freedom of action within certain power structures is valued. To protect the environment, and to provide for adequate economic investment within legal justice as well as personal and social security have been made the foundation for behavioural options.

Based on a number of analytic propositional statements, the degree of subjective certainty on the existence of these affordances has been judged (Bierschenk, 1990 a). Because this procedure is object-governed, it has been possible to demonstrate factor analytically the existence of two orthogonally behaving components. One refers to the "Visibility of Social Texture" which specifies the observer's place in the social system. The other concerns possible development of "Eigenvalue", "Worth" or "Dignity" of a person. Both components can be comprehended as an "outline-drawing" of a social system in action. The fact that the relation between these components and the experimental subject can change during simulation is interpreted as meaning that the individual has changed his preferences.

The effects of changing preferences have been investigated by comparing the variations in the modelled environments with the variations in one's familiar surroundings, i.e. Sweden. Based upon the representational nature of the modelled societies on one hand and "the Swedish model" as referential reality on the other, it was possible to give a formal definition of *quality or depth* of civilisation by contrasting both, i.e. the formal with the referential. In order to separate the effects of model-typic judgements from proto-typic judgements, realness of differences has been studied by means of the Factorial Discriminant Analysis (Cooley and Lohnes, 1971, 99. 299-323) and the results have been published in Bierschenk (1987, 1988 a, b, c).

Experiment

The purpose of the present experiment is to give an account of the individual's text building behaviour in relation to his referential society. In short, the essential task is to build up knowledge about the individual's ability to put informational invariants pertaining to the referential environment into words and to perspectivate its experiences within his familiar surroundings. Of primary concern to the methodological approach in the present context is its focus on relevant and legitimate measures of the following proposition:

Proposition: The individual's ability to give expression to cognitive integration of experience in covariation with personal knowledge is reflected through natural language.

The basic assumption underlying this proposition is that selective attention and schematising are directly built into the perceptual process. Therefore, it is argued that expressed

perception encompasses the physical and motor activity of verbalisation. It implies the hypothesis that the perceptual schema defines the quality in text building behaviour. Consequently, the perceptual path taken and its "phase sequences" as well as the "assemblies" of phase sequences should be discoverable through natural language expressions. Because the Kantian schema is embodied in language, it should be possible to study the variations in schematising on the basis of the (AaO) paradigm. In relating schematising to the Growth model which has been conceived of as the one that promises prosperity, it was possible to discern differences in individual topological structures characterising the chosen observational paths (Bierschenk, 1990 b).

Proto-typic Environment

Preconditions for an experimental processing of any discourse on a proto-typic environment is (1) the exact determination of its topic, (2) the determination of the circumstances under which a discourse was produced and (3) the determination of the producer of the discourse. Of special significance for the intended analysis is a specification of the topic in close connection to the modelled societies. The first requirement that has to be satisfied concerns the level of abstraction at which the environmental affordances shall be specified, because they determine, and therefore ultimately define the quality of civilisation. Consequently, the natural choice of the topic is Sweden.

Method

The circumstances by which Sweden could be made the natural topic of an essay assignment occurred in 1991. Three weeks before National election, 85 students, born in 1973, and enrolled in three different classes of the technical Gymnasium of the City of Malmö, were given the task to prepare for a four hours essay writing. On the day of writing (17th September, one day after election day) the following instruction was handed out:

" Write an argumentative essay on Sweden as a land to live in. Take your own choice of subject and headline. As foundation, you will use texts that you have searched for by yourself in newspapers, weekly publications, and professional journals (magazines) etc. At least two but no more than three texts should be cited. These texts have to contain such statements that you can refer to. Hand in the texts together with your essay.
Aids: Dictionaries, own material, prepared 'scribbles'.
Signature
Teacher of Swedish"

The realism in the discourse itself is dependent on previous knowledge, but the requirement of co-operation between awareness of a social system and information processing depend on the given instruction. It governs the data collection and generation of possible hypotheses. The student's task is to select appropriate objectives and to put these into words. This means that the substantial world has meaning to the extent that substance can be put into words. Meaning that has been put into words is explicit and communicable, because description converts the environmental invariants into text.

Subjects

The assumption underlying the selection of the subjects is that the realism in awareness of one's surroundings is indirectly expressed by the assessments of one's own performance in relation to what the teacher has been able to assess. This is not only a matter of intelligence or ability of scholastic performance. Writing an essay on Sweden was introduced as a preparation for the central examination. Grades obtained on this exam

are conceived by the students as esteemed indicators of achievement. Consequently, it was but a small step to link the students orientation toward the task with their willingness to perform well in evaluation.

In all 85 essays were collected in order to be evaluated by the teacher. Evaluation of essays as part of a teacher's duties is usually made on implicit assumptions and criteria which produces grading that are the result of impenetrable processes. In this sense, students are normally confronted with grades on their assignments whose meaning cannot be recovered. In recognising the complexity of dependency relations between the teacher, the student and the subject, a first measure in the approach taken was to determine the grades of the essays on the basis of the following five criteria:

1. Conception of subject:	Broad, narrow, side-track, misconstruction of headline
2. Subject matter:	Use of text material, balanced presentation of referred statements in comparison to one's own opinion, choice of texts in relation to headline. Selection and adequacy of ideas and supplementary details.
3. Disposition:	Discoverable plan and means of transition between ideas. Logical procedure in operationalising the topic, jumping and leaping in the line of thought, sufficiency of transfer from one aspect to the next, length of text.
4. Citations:	Identification of used sources in the essay, presence of marks enclosing cited statements, presence of a list of references.
5. Style:	Choice of words, way of expressing oneself, level of style, syntax errors, violation of spelling rules, presence of paragraphs.

Each criterion has been weighted such that a maximum of 10 points were assigned to each one whenever the desired text building behaviour was expressed clearly. A maximum of 50 points could be obtained when all the specifications listed were satisfied. This methodological procedure was oriented toward the task of ordering the essays with respect to the teacher's grading.

A further step in the procedure for selecting the experimental subjects was introduced by letting the students themselves classify their own essay on the basis of the given criteria. The instructions given orally have emphasised the importance of the student's doing well on the task presented to him. The intention was to make the evaluation process transparent to the student and to involve him personally. The major point stressed in the oral instructions was that it would be in the student's best interest to grasp the significance in the application of the criteria as a preparation for the upcoming essay writing in the national wide examination ("centralt prov" = central examination) in order to achieve a high level of accomplishment.

The relationship between belongingness to a particular class and grading has been of major interest for the planning of the study and has been analysed on the basis of a multivariate analysis of variance. The computational problem was solved with the Generalised Linear Model (GLM) procedure of Minitab (1991). The results are shown in Table 1.

Table 1.

Multivariate Analysis of Variance for Teacher and Student Grading of an Essay on Sweden

Source	DF	SeqSS	AdjSS	AdjMS	F	P
1.Class	2	1003.35	1003.35	501.67	7.23	0.001
2.Grading	2	1068.45	1059.94	529.97	7.63	0.001
1x2	4	210.66	210.66	52.67	0.76	0.553
Error	246	17076.22	17076.22	69.42		
Total	254	19358.68				

There would be no reason to perform a multivariate analysis if the variables were uncorrelated. Therefore the correlation were first inspected. Because of substantial correlation (r = .49 - .55), this multivariate approach were chosen, because it would not ignore the interrelation among the variables. Since the design is of the AB-type, two main effects have been tested. As expected, both show significant differences in level, though they are of no interest in the present context. What matters for selection is whether or not a class-by-grading interaction effect shows up. As can be observed in Table 1, the interaction is not statistically significant. It follows that there is no particular reason to examine the discriminating effects of class and grading differentially.

Before selecting subjects from the permissible pool of 85 students, the teacher's grading were plotted against their normal distribution scores. Points and normal scores correlate with (r = .996). On the basis of this plot the students with the lowest (9%)and highest (7%) points of achievement have been determined. These percentages fall outside the range of (s = 1.5) around the mean (m = 0). From the respective group the student with minimal deviation as well as the student with maximal deviation from the teacher's evaluation were chosen as experimental subjects. Their results are shown in Table 2.

For example, subject (3) has performed relatively poor but shows amazing awareness and seems to have a realistic conception of his ability to perform. Subject (1) represents the other extreme case, in that, the teacher's points are matched by the subject's own assessment. Subject (2) underestimates his performance, which points toward some limitations and inadequacies in the view on one's own performance. On the other hand, subject (4), who greatly overestimates his performance, seems to have little awareness of his unskilled writing.

Table 2.

Order of Achievement for the Four Experimental Subjects

Teacher's points	Student's points	Diff.	Order of Achievement
45	44	- 1	1
47	28	-19	2
18	20	+2	3
12	36	+24	4

Materials. It has been appropriate to let the subjects describe the contents of their essays by as many statements as they wished to formulate. Moreover, each subject was asked to state in quantitative terms to what degree the respective statement reflected his

personal view, i.e. private opinion (1) or public opinion (10). This means that the essays of all subjects can be semantically qualified to the degree to which each subject were able to produce statements and to assign numbers to their statements. The basis for quantification of the statements constructed by the four experimental subjects is given in Table 3.

Table 3.

Subjective Statements on the Contents of Produced Essays

Subjects and Content of Statements	Preference
1.1. Medical services have a high standard and a rich spectrum of specialisation	4
1.2. Carelessness, ignorance and lack of resources produce poor medical care	3
1.3. We take good care of our citizens from birth to death	4
1.4. Various statements of atrocity examples	8
2.1. Young people are concerned more about money than work environment (milieu)	8
2.2. Elderly people are of the opinion that environment and comfort are at least as important as (money)	8
2.3. Despite that one improves the work environment, it does not mean that the comfort is improved appreciably	9
2.4. Although the work environment is bad, one can still feel at home	7
3.1. Demand for higher child and housing allowances is made by the one's who are badly off	1
3.2. Children with parents taking public assistance are mobbed and the saying is going	1
3.3. The family borrows from acquaintances in order to manage an economical crisis	1
3.4. Young girl becomes pregnant by mistake, refuses abortion	5
3.5 All, who want to have a child, cannot get it	8
4.1. Sweden develops into a frustrated country without vision	8
4.2. The rape of the social organisation upon the environment, fixating of election discussions on the "wallet"-questions	6
4.3. It appeared in the shallow discussion of questions like the bridge over the Sound, European Market, Nuclear Power	1
4.4. Yes for Nuclear Power. An obligation for productive industry	1

The intention with this behavioural-semantics approach has been to give a superficial account of the subject's essay writing through his own formulation and assessment of

opinion. Magnitude estimates require the subject to state a number that represents the felt intensiveness of private/public opinion of the statements. Independent of their particular content, the statements can be tested for differences. On the assumption that a subject can be abstractive, his ability to single out privateness as the dimension of measurement can be used for a demonstrative definition of the produced essays. The statistical results are shown in Table 4.

Table 4.

Analysis of Variance: Private Opinion in Subjective Constructed Statements

Source	DF	SeqSS	AdjSS	AdjMS	F	P
Rows	1	7.066	5.095	5.095	0.58	0.458
Columns	1	4.112	3.042	3.042	0.35	0.565
RxC	1	28.463	28.463	28.463	3.27	0.094
Error	13	113.300	113.300	8.715		
Total	16	152.941				

The results reported in Table 4 show no statistically significant effects, if one applies the conventionally chosen level (p = 0.05). Therefore, no conclusions will be drawn with respect to the way in which the individual subject understands himself and his surroundings from his unique vantage point.

Design and Procedure. Obviously, this kind of measurement cannot provide for the self-organising quality of the essay, seen as natural system. Such systems become structured by various flows of energy and information through their own internal processes. Moreover, an essay has to be conceived of as a self-referential system. This implies that an essay need to be recognised as an intentional "act". Self-referentiality means that no master interpretation can be forced upon text. Founded on the Kantian schema axiom a theory and method has been developed that recognise language as self-referential system (B. Bierschenk, 1991). The purpose with this method is to differentiate the perspective structure of the text producer from the objective structure of the text. Whether and to what extent perspective information can be picked up by the method depends on the perspective chosen. Perspective is something that is in the verbal flow of the text producer which requires an information "flow" analysis(I. Bierschenk, 1992). As will become evident, the rhythm in text building behaviour makes up the foundation for the method "Perspective Text Analysis", whose principles have been implemented into the PC-system PERTEX (Helmersson, 1992) . The system takes normal text and converts the mentality underlying a subject's text building behaviour into a topological representation. The text materials of the subjects will be processed by the following steps: (1) Coding by means of the AaO algorithm which has been developed out of the Schema axiom, (2) supplementation of A- and O-dummies produced during algorithmic processing, (3) generation of A- and O-matrices, (4) cluster analysis and (5) topological presentation of outcomes. Because of its multilingual design, PERTEX can handle text in various languages and different languages can be selected for user interaction with the system. Compared to common text processing systems, distinction and identification of the agent and agencies provide for the establishment of radically different approaches to natural text production. PERTEX has the potential to give a description of flows of information belonging to the kinematics of text production.

Results

The analysis that follows is based on the assumption that language represents a natural system whose units are interdependent and complex. Higher order relations governing the process of text production may arise in various ways and under extremely varied circumstances. Due to the fact that there is no way of proposing an unambiguous strategy, which defines the interactions of primitives, an approach has been chosen that takes into account that novel properties always emerge at some chosen level that cannot be explained with reference to processes at submerged levels.

By studying information flow processes and their interactions a kinematic description of text building behaviour can be given that provides a connection to thermodynamics and thus to physics. The kinematic description that follows is on text building behaviour in which the mass term is absent. It rests on the assumption that the four experimental subjects can fashion their behaviour in such a way that the product is in agreement with observed environmental changes at the same time as it conserves its fundamental form. The thesis is that the degree of consciousness is the product of an active inquiring agent as reflected through language and that well organised language functions permit the determination of information flow processes. These functions are of essential nature in that they determine the structure of the information flow.

Through the subject's coordinative text building behaviour linkages are established or broken. In PERTEX subroutines have been developed for the purpose of computing these subtle and interdependent relations existing within and between the AaO unities. In this process, distinctive strings of graphemes constitute the basis for numerical analyses. Abstracting or extracting a structure from textual elements requires the grouping of individual variables into clusters for the purpose of finding structural invariants. This procedure is founded on the steering and controlling function of the agent component (I. Bierschenk, 1987). It controls perspective and indicates what the intentions are that operate at the textual level. Differentiating the groupings of the agent variables from the groupings of the objectives (Figure, Ground, Means and Goals) means that A-clusters and O-clusters are separately listed as shown in Table 9. Clustering means that a minimally sufficient number of independent states can be determined on empirical grounds and that the criterion value ($p < 0.05$) can be applied to the results of different analyses. The conditional assumption is that significant groupings point toward the existence of structured configurations of textual agents and objectives.

The strategy of studying the subject's way of making use of strings of graphemes and the dynamics associated with it shows clear differences as is indicated in Table 9.

Table 9.

Significant Groupings of Agent and Objective Components

Component	O-cluster	P(t<T)	A-cluster	P(t<T)
Subject 1				
Figure	33	0.0317	2	0.0298
Ground	3	0.0496	2	0.0443
Subject 2				
Figure	19	0.0213	2	0.0402
Ground	3	0.0221	3	0.0274
Subject 3				
Figure	14	0.0474	4	0.0394
Ground	3	0.0560	2	0.0851
Subject 4				
Figure	7	0.0464	3	0.0485
Ground	3	0.0662	2	0.1008

From a theoretical point of view it is important to notice that the Ground components synthesised by Subject 3 and 4 do not meet the criterion value. This gives an indication of unrelatedness and absence of a taken standpoint that anchors or constrains the phenomenon. The states of the Figure are by far the most important, because they are responsible for the transformational dynamics of the viewpoints incorporated into the text. To be able to hold down this component is an important step in the development of text building behaviour, because the Ground component conveys its relational meaning. The process of transforming observations into text requires the ability to synthesise successively, which means a progressive constraining that influences the process of folding experience into textual strings. A glance at Table 9 makes apparent that the process of concentrating the viewpoints of the Figure varies greatly. To what extent the observed numbers of clusters deviate substantially from expected numbers can be tested statistically. Since text building behaviour can be related to the outcomes of clustering, it is possible to formulate the zero hypothesis and its alternative.

H_0: The configurational states of produced text do not deviate from the theoretically expected distribution of states.
H_1: The outcome of the clusterings deviates from theoretically expected distribution of states.

Since the original variables for classification have been dichotomised and the measures are mutually exclusive and exhaustive, a chi-square test is appropriate. A test within the framework of a fourfold table has been carried out and shows a chi-square in the following interval $p < 0.025 = 5.02 < 5.48 < 6.63 = p < 0.01$. What can be demonstrated thus far, is the significance of subtle and interdependent relations holding between the linguistic and the informative aspects of language as system and its large-scale theme producing AaO-machinery, i.e. its inherent dynamics. But what kind of themes are governing the behaviour of the subject can become evident only through a graphical representation of the configurational order that displays the clustered viewpoints in relation to each other.

Configurational Orders

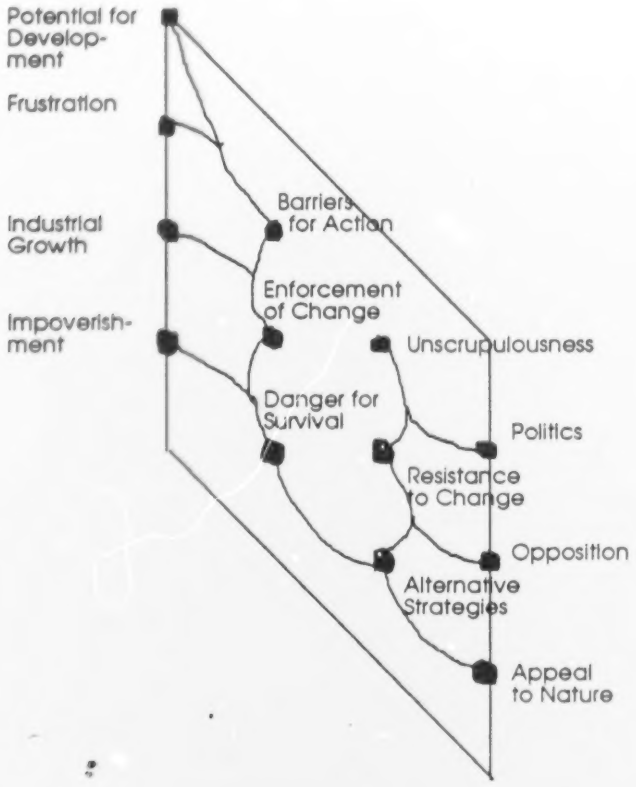
Assembling text building behaviour into thermodynamic "source-sink" relations allows for both the definition and detection of the morphological properties of verbal flows

and their underlying higher-order invariants. The latter are functional in that they constitute the basis for displacement which is a kind of movement production. From a topological point of view, the course to be taken in text building behaviour passes a succession of point attractants or singularities which are topological invariants. Each singularity is the result of a transformational step in which the prototypical names at the borders of Figure 1 address the clusters of textual strings that mark the terminal states of the transformational process involved. These variable states are responsible for the specificity of the manifested path. A selected path has a topologically distinct layout of its singularities. These are to be associated with a qualitatively striking kinematic description of produced text.

Subject 4

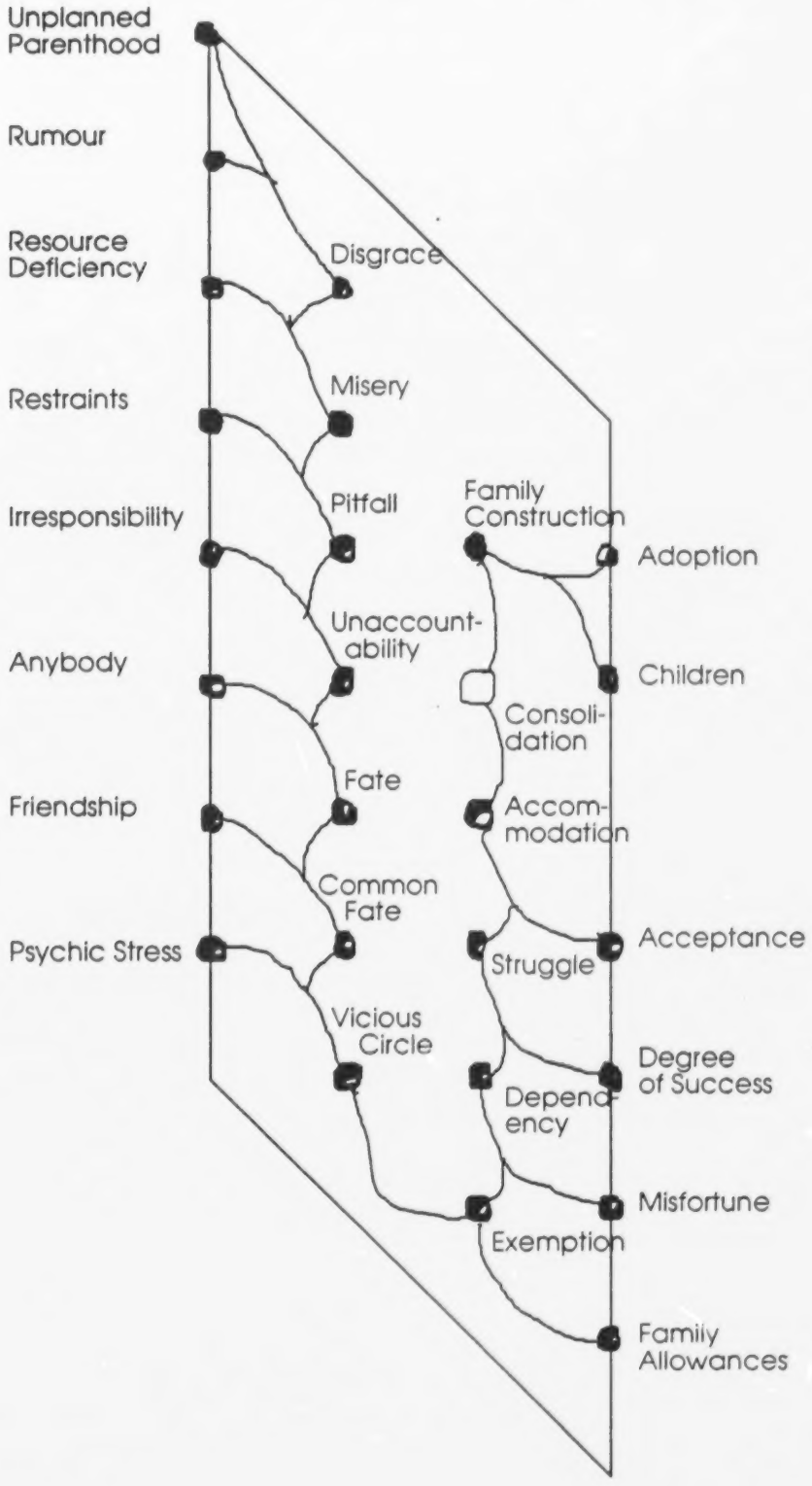
The homorhesic path of Subject 4 is depicted in Figure 1. The path is characterised by a relatively simple pattern of singularities and oriented toward one global attractant. This is the highest point of the curve. The terms of the Figure represent a structure which can be described on the basis of two intentional (horizontal lines) and two orientational (vertical lines) dimensions. The first intentional dimension concerns ignorance to change, while the second one manifests an indignation. Both dimensions imply a subject that is a complexer or globalist naturally inclined to doctrines, because of lack of domain specific knowledge combined with felt anger or scorn aroused by inferred lack of fairness. The first orientational dimension contributes with a configured opportunity to choose among several possibilities. Though the second dimension implies a configured absence of ethical objections to certain actions. It appears that this subject is unable to pick up positive affordances. The simple expression of emotional tension in his own statements on the text is in correspondence with the experimental outcomes. They are directed toward criticism of other persons, objects and circumstances.

Figure 1.
The homorhesic Path of the Figure Component of Subject 4



In the present context, it is the text produced by Subject 3 that has contributed to a significant deviation from the expected distribution of state variables (clusters).
This makes his text building behaviour of special significance to an analysis of how the verbal flow possessed by his text translates into a structured configuration. The result is reproduced in Figure 2.

Figure 2.
Hysteresic Path of the Figure Component of Subject 3



Subject 3

Figure 2 depicts a structured configuration that is governed by twice as many state variables compared to the text produced by subject (4). A state variable abstracts as much information as possible from the strings of letters related to the state. Continuous succession of states determine successive singularities and ultimately the path taken.

The depicted path is initiated by a state that concerns a life event that is potentially stressful. The first dimension picks up this orientation toward possible negative consequences of becoming a poor single parent. To reverse this situation, it is the social welfare agencies that are expected to do all they can to manage threats to the expecting mother's well-being. Support is considered a social resource as well as children are viewed as a source of support. Moreover, coping plays its part in the orientation expressed by the second dimension. Coping can be conceived of as the individual's own attempts to modify or improve stressful circumstances. When these are accompanied by agitative thoughts a desire for actions of a certain kind may arise more so then for a desire to reach some specific ends. The forceful or e-motional state of adaptive behaviour characteristic of the first path in the Figure is directed toward the avoidance of painful tension. This is conceived to counteract social well-being.

The writing style of Subject 3 is not different from ordinary spoken language. Consequently, the disposition is governed by functional words mainly. Refined words and crystallised concepts have not been used. The text illustrates especially well its producer's dependency on the speaking mechanism that converts his viewpoints into text. His experience of emotions of "shame" and embarrassment are not attributed to others failures but seem to be used in condoning instead of condemning. Passing off his emotional tension has led him to a greater degree of anxiety than expressed by Subject 4. His reference to unavoidable circumstances and his emphasis on the conciliation of others and himself to the disagreeable situation is a way of easing "anxiety" even at the price of self-deception.

Subject 2.

Turning to Subject 2, it becomes possible to extend the analysis to a text whose configuration has both Figure and Ground component present. The graphs are shown in Figure 3(A,B). The Figure component depicts two orientational dimensions. One picks up the invariants of the environmental context. and the other the behavioural invariants embedded in this context. The Subject's ability to relate the right behavioural course seems to depend on his ability to face up to the full range of consequences specified through the rules and customs of particular organisations with their obligatory contents. Connected to this orientation is a certain conception of justice which implies a focus on every-day problems of supporting one's living.

"Compliance" marks the Subject's orientation toward obedience and acceptance of the limitations of the labour market which reinforces this behavioural response. This line of thought follows Skinner's by now classical model of operant conditioning. It implies the adherence to "Conditioned behaviour". The focus of the perspective of the Subject 2 is on the unfilled encircled attractant which means that he has successfully mastered the task of correctly discriminating a set of stimuli for which industry as external source defines the right behaviour. What the graph gives expression to is that the Subject successfully has learned the discrimination task. Though the intellectual process involved in this behaviour has to be understood in the context of degree of awareness. This assumption gets its support through the Ground of the Figure presented in Figure 3(B).

Figure 3(A).
Figure Component of Subject 2

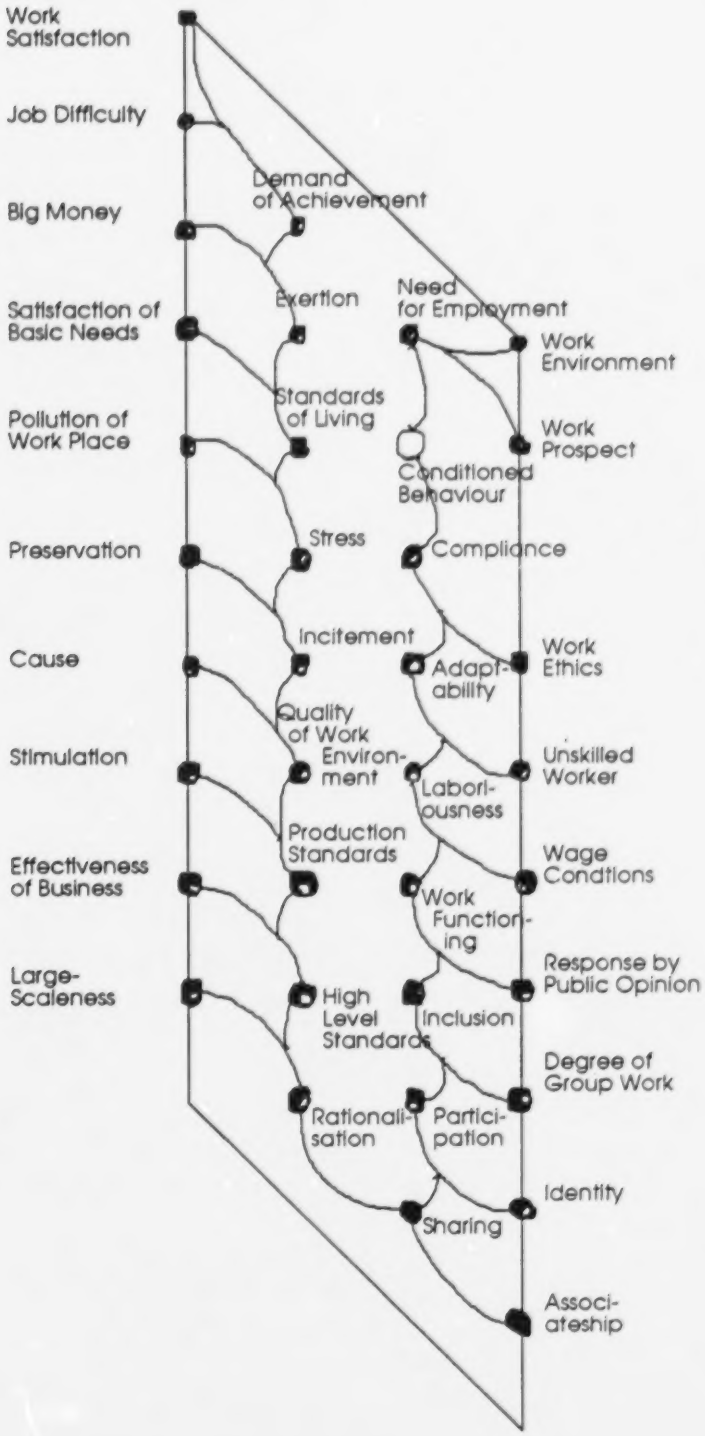
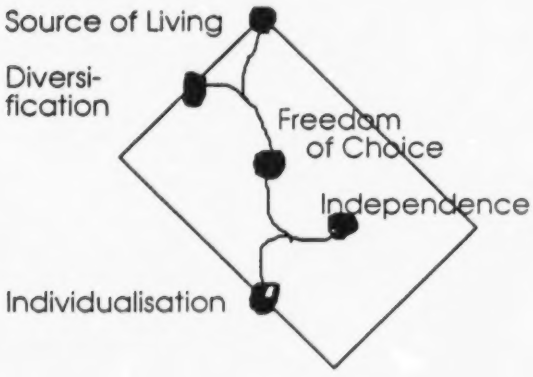


Figure 3(B).
The Ground Component of Subject 2



Diversification transforms work as Source for Living in order to give oneself a hedge against fluctuations in the labour market while simultaneously being aware of the burden to develop new competencies. Awareness of what one is conscious of is intimately related to bonding of people. Disrespecting a person's choice means depriving him of opportunities to choose and to act independently. This in turn implies the nature and limits of the organisational rules that can be implemented. This is just what the Figure component suggests. The implication is not one of inconsistency between sensitivity to right and wrong, but is rather the opposite. Respecting choice entails a particular stand on distributive justice which implies one's "Independence", i.e. capability to exercise the choices justice secures. Finally, respecting choice presupposes a subject possessing "Freedom of Choice", i.e. an agent who has the power to decide differentially. The Subject's perspective on the Ground component is identical with the Ground itself. His perspective is that of an utilitarian. Bonding people to their choices makes sense only within the framework of public obligations or legal background, where people are ordinarily free to make choices for themselves. Otherwise no special warrant for justice would be required.

Characteristic of the text produced by Subject 2 is a configurational structure that is more elaborated than the preceding ones and its Figure has a Ground to which the Subject's imagination can be related. The present structure describes a course of text building behaviour whose central theme is behavioural control. It means that his writing style gives rise to an adaptive behavioural inclination. His perceptual awareness is not dependent on the "object of writing", but predominantly an effect of integrated experience from the past. Through this integration, the past is made an active part of his essay writing. In this respect, his text building behaviour is totally in agreement with the fact that every conditioned response depends upon perceived or conceived pressure. What is important to note, is that pressive writing is usually done unconsciously. The writer merely re-acts.

Therefore, the given subjective statements on the content of his essay are meagre explanations. They do not coincide with the determined configurational structure, if one is not willing to infer the prevalent acting of the behavioural principle of incitement (reward) and environmental dependency. Moreover, the intellectual process involved in this behaviour may explain the discrepancy in grading. Subject 2 has not judged his actual

performance but unconsciously relied on conditioned behavioural norm, which is the result of experienced grading in the past.

Subject 1

With respect to the number of state variables describing the language body of Subject 1, he has outperformed all others. The states signal an even greater elaboration of the path taken. As shown in Figure 4(A,B), the determined path has also greater conceptual depth compared to the preceding paths. Its most salient features are the encircled singularities. The larger the number of circles the greater is the conceptual depth. This can be identified with his sensibility to the organisational properties typical of a welfare state. Together, the unique layout of the substructures shows the individual's concern with the most prominent welfare setting, namely the States Public Health Service. Human properties are reflected against possible negative influences of scientific-technological progress and pseudo-progress pointing toward some moral dilemma inherent in the constructive process of building up efficient organisations. Since ancient times it is a well-known fact that all reorganisation has an inbuilt component that act destructively on morality.

Effective implementation of controls is in the focus of the perspective of Subject 1. His constructive systems view is oriented toward an attitude underlining successions of system changes and a challenge to conserve high levels of standard.

The stated Ground, shown in Figure 4(C), ties this imagination of Sweden as Welfare State to the structure of reason given by the path. This path concerns the achieved level of welfare. This level is deliberately dependent on an improved quality in individual relationships with others. Without this, all scientific-technological advancement may only result in an organisational crisis that lies not just in mismanagement but originates well in the capacity to solve basic problems of social living in relation to the organisational settings that circumscribe social existence. It is the threat to human dignity, rooted in the failure of effective systems control, that constitutes the fundament to the presented structure of the Figure. This view is also reflected by the personal statements in that they give expression to perceived problems with systems engineering.

By all measures, Subject 1 has performed far above Subject 2, and thus should have earned a number of points that places him at least one if not two grades above. Conversely, the most realistic scoring of Subject 2 is his own. The teacher's grading involved a list of criteria and the assignment of numbers to largely formal aspects of essay writing in order to preserve objectivity. What cannot be assessed by this procedure is the kinematic aspect of text building behaviour. By relating the latter to achievement gives obviously a more valid representation as indicated by the overall performance of Subject 2 over the academic year which has earned him three grades at a five points graded scale. The same grade would have been assigned to his own scoring (28 points = grade 3). Despite the care taken in grading the essays objectively, the level of performance places Subject 2 two steps below Subject 1.

Figure 4(A).
The Figure Component of Subject 1

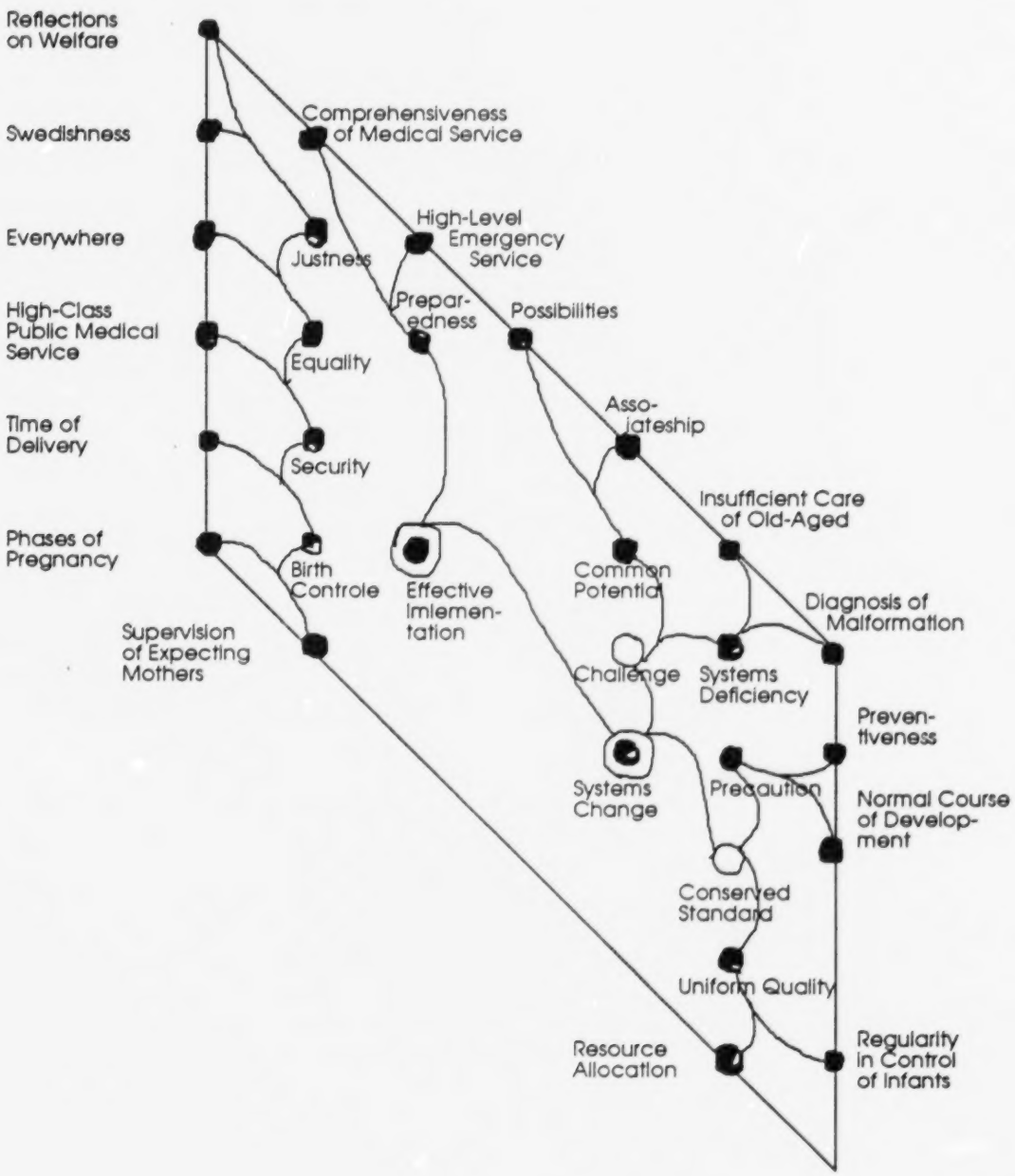


Figure 4(B).
Cont.

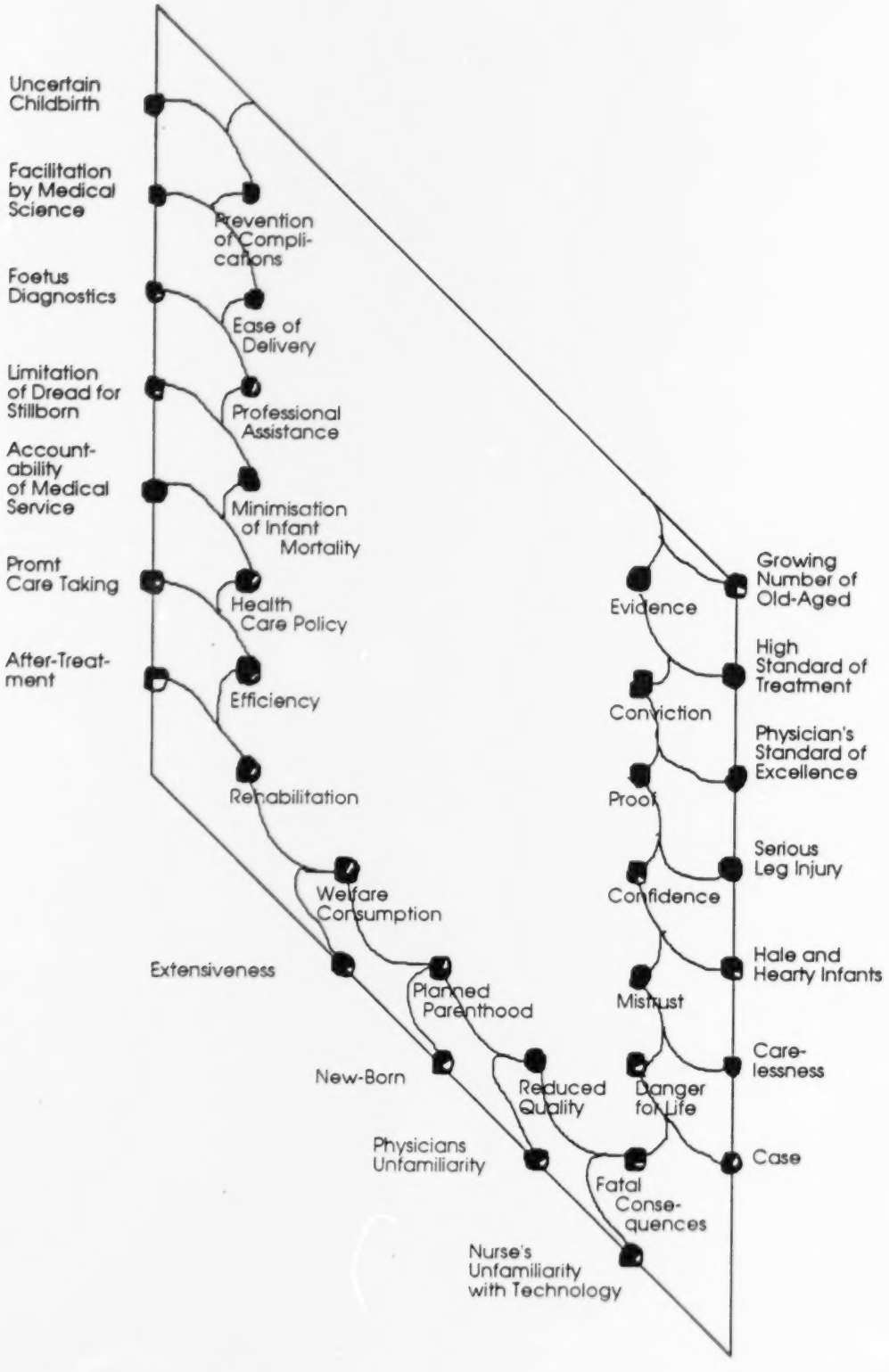


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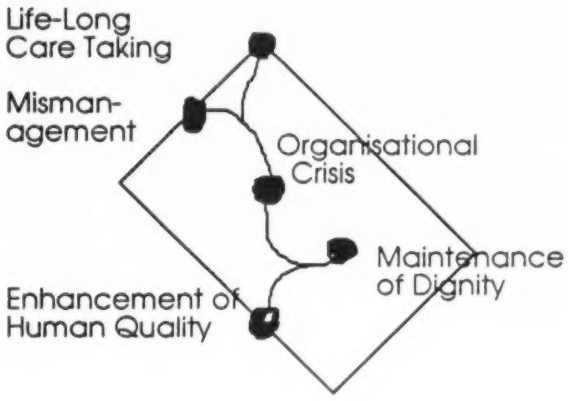
Figure 4(C).
The Ground Component of Subject 1



Discussion

The four presented profiles will now be discussed in relation to the presented model societies. Within a multiple discriminant space the "Swedish model" has been judged to be as prosperous as the Growth model, but in orientation not so materialistic. From the profile of Subject 1, it becomes obvious that he has produced an articulated systems engineering point of view and adheres to a fairly well developed ethical standard. It is an outstanding achievement that he has been able to connect ethical and moral problems with organisational change as the moral problem of our time. The emerging perspective converge with the general theme of the Growth model.

The fundamental difference between this orientation and that present in the profile of Subject 2 relates to the view of social engineering. The individual is concerned with his ability to learn what is right or wrong and to adopt the requirements of obeying by behavioural adjustments to environmental constraints (social, legal, ecological). He strives for autonomy but is not committed to identifiable ethical and moral principles. This attitude guarantees, as he sees it, the achievement of a desired standard of living which is the behaviouristic or utilistic way of conceiving society. As highlighted by the grading discrepancy, the distorting expectations as determinant of text building behaviour cannot be overemphasised. In effect, expectation is a belief regarding sources of reinforcement.

Most concrete have been Subject 3 and 4. These individuals have manifested a level of complexity at which everything is seen as black and white. The entire world fits into specific stereotypes. These individuals are quite rigid in their text building behaviour. They have produced a dogmatic and authority-oriented outlook which does not exclude rebellious tendencies and considerable uncertainty about the doings of one-self. Both profiles are unrelated to the main question of the experiment, provided that this tendency of attributing success and failure to external factors (luck and difficulty of making a living) are not conceived of as part of the Behaviour model.

The goal of the similarity analyses of the four subjects has been to compare the transformations of co-ordinate spaces represented by these individuals. A subject of the present experiment is an instance of a bio-psycho-physical system that is capable of producing text building behaviour of style *S*. Each individual subject provides a unique physical context for the expression of the informational law involved in the conservation of topological properties associated with kinematic flows. It is essential to note that text building behaviour operates on the basis of a great number of degrees of freedom at the

mechanical level of text production, but is totally controlled by the informational constraints operating at the thermodynamic levels. This means that many junctions are involved in the expression of the magnitudes of forces and powers that differentiate the systems of reference. Because information about conceived relations between a multitude of system variables cannot be obtained by these measures, it became an essential task to relate the individual's discourse on the dependency relations of the components specifying his familiar environment to the discrimination spaces of the modelled societies. The relation between the models and the four presented profiles provides the foundation for making the "unknown" known. The overall importance of the analyses rests on the demonstrated operational similarity between the Behaviour and the Growth model (Bierschenk, 1988 c). Both represent alternative instances of the principle of association. Therefore, it can be concluded that Subject 1 and 2 conceive their referential reality similarly. What makes them dissimilar concerns the relation between (ob+audire) and the consequences of delinquency which, according to Skinner (1972), is "beyond freedom and dignity". An articulated and differentiated consciousness in the Kantian sense can only be attributed to Subject 1.

References

Bierschenk, B. (1984). *Steering mechanisms for knowability* (Kognitionsvetenskaplig forskning, No. 1). Lund, Sweden: Lund University, Department of Psychology. (ERIC Document Reproduction Service No. ED 264 246, TM 850 437)

Bierschenk, B. (1987). *Perception of quality of life* (Kognitionsvetenskaplig forskning, No. 16). Lund, Sweden: Lund University, Department of Psychology. (ERIC Reproduction Service No. ED 282 892, TM 870 265)

Bierschenk, B. (1988 a). *The visual cliff transformed. A factor analytic definition* (Kognitionsvetenskaplig forskning, No. 25). Lund, Sweden: Lund University, Department of Psychology. (ERIC Document Reproduction Service, No. ED 340 712, TM 013 836)

Bierschenk, B. (1988 b). *The spirit of human enterprise. A multivariate approach to a study of projected social organisations* (Kognitionsvetenskaplig forskning, No. 26). Lund, Sweden: Lund University, Department of Psychology. (ERIC Document Reproduction Service, No. ED, SO 020 591)

Bierschenk, B. (1988 c). A theoretical basis for estimating quality of life. *European Journal of Political Economy*, *4*, 323-332.

Bierschenk, B. (1990 a). *Behavioural semantics. A comparison between topologic and algebraic scaling in the measurement of human dignity* (Kognitionsvetenskaplig forskning, No. 33). Lund, Sweden: Lund University, Department of Psychology. (ERIC Document Reproduction Service, No. ED 320 914, TM 014 795)

Bierschenk, B. (1990 b). *The topological scaling of consciousness. The world in the perspective of economists and technologists* (Kognitionsvetenskaplig forskning, No. 34). Lund, Sweden: Lund University, Department of Psychology. (ERIC Document Reproduction Service, No. ED, SO 030 280)

Bierschenk, B. (1991 c). *The schema axiom as foundation of a theory for measurement and representation of consciousness* (Kognitionsvetenskaplig forskning, No. 38). Lund, Sweden: Lund University, Department of Psychology. (ERIC Document Reproduction Service, No. ED 338 650, TM 017 363)

Bierschenk, B., Helmersson, H., & Lohmander, B. (1987). *Worthiness as behaviour component* (Kognitionsvetenskaplig forskning, No. 17). Lund, Sweden: Lund University, Department of Psychology.

Bierschenk, I. (1987). *The controlling function of the agent in the analysis of question-response relationships* (Kognitionsvetenskaplig forskning No. 18). Lund, Sweden: Lund University, Department of Psychology. (ERIC Document Reproduction Service, No. ED 295 945, TM 010 264)

Bierschenk, I. (1992). *The pendular movement of text building*. (Kognitionsvetenskaplig forskning, No. 42). Lund, Sweden: Lund University, Department of Psychology.

Bierschenk, I. (1992). *An excursion into the ecological co-ordinates of language space*. (Kognitionsvetenskaplig forskning, No. 43). Lund, Sweden: Lund University, Department of Psychology.

Biological Sciences Curriculum Study, & Crystal Productions (1976). *The program guide to projections for the future*. Boulder, CO: Biological Sciences Curriculum.

Brodsky, C. (1987). *The imposition of form. Studies in narrative representation and knowledge*. Princeton, NJ: Princeton University Press.

Cooley, W.W., & Lohnes, P.R. (1971). *Multivariate data analysis*. New York: Wiley

Helmersson, H. (1992). *Main principles for perspective text analysis via the PC-system PERTEX* (Kognitionsvetenskaplig forskning, No. 41). Lund, Sweden: Lund University, Department of Psychology.

Kant, I. (1975). *Die drei Kritiken in ihrem Zusammenhang mit dem Gesamtwerk (The three critiques together with their connection to the complete edition)*. Stuttgart, Germany: Alfred Kröner Verlag.

Kugler, P. N., & Turvey, M. T. (1987). *Information, natural law and the self-assembly of rhythmic movement*. Hillsdale, NJ: Erlbaum.

Meadows, D. H., Meadows, D. L., Randers, J., & Behrens, W. W. (1972). *The limits to growth*. London: Potomac Associates.

Minitab (1991). *Minitab reference manual. Release 8 PC version*. Rosemont, PA: Quickset Inc.

Skinner, B. F. (1960). *Walden two*. New York: McMillan.

Skinner, B. F. (1972). *Beyond freedom and dignity*. London: Jonathan Cape.